THE INVENTION CLAIMED IS

1. A process utilizing sol-gel chemistry for producing energetic materials.

2. The process of Claim 1, wherein the energetic materials are produced using sol-gel chemistry utilizing a methodology selected from the group consisting of solution addition, solution exchange, powder/particle addition, functionalized solid network, funtionalized energetic network, and micron to sub-micron (nano) composite.

3. The process of Claim 2, carried out by solution addition which includes dissolving energetic materials in a solvent which is compatible with a reactive monomer and mixed into a pre-gel solution, gelation of the solution wherein the energetic material is uniformly distributed within pores of a solid network formed by the polymerization of the reactive monomer, thus allowing deposition of the energetic material within the gel.

4. The process of Claim 2, carried out by solution exchange which includes forming a solution, gelation of the solution, and after gelation, the liquid phase is exchanged with another liquid which contains an energetic

material constituent, thus allowing deposition of the energetic material constituent within the gel.

5. The process of Claim 2, carried out by powder/particle addition which includes providing an energetic material in powder or particulate form, and either mixing with a pre-gel solution or adding to a pre-made gel, resulting in a composite of gel and suspended particles.

6. The process of Claim 2, carried out by functionalized solid network which includes using reactive monomers which have functionalized sites dangling throughout the solid network after gelation, dissolving an energetic material in mutually compatible solvents and diffusing into the gel which allows the energetic material to react and bind to the functionalized site, controlling the amount of energetic material by the number of functionalized sites while ensuring homogeneity at the molecular level.

7. The process of Claim 2, carried out by functionalized energetic network which includes providing energetic material constituent molecules, and functionalizing the energetic material constituent molecules, and functionalizing the energetic material constituent molecules so that they can be reacted in solution to directly form a three dimensional solid or gel network which incorporates the energetic material molecules at the finest scale.

8. The process of Claim 7, wherein the solid network is the energetic material, and controlling the concentration by co-reacting with other inert reactive monomers.

9. The process of Claim 2, carried out by micron to submicron (nano) scale composite which includes forming a skeletal structure containing void spaces and wherein the skeletal structure and void spaces contain one of a fuel and oxidizer.

10. The process of Claim 9, additionally including forming conductive gels which form the skeletal structure and void space, and utilizing the skeletal structure as substrates for the electrochemical precipitation of metal fuels.

11. The process of Claim 9, wherein metals may be deposited with the skeletal structure and void spaces via decomposition from the liquid or gas phase of the process.

12. The process of Claim 9, additionally included utilizing the void spaces for the addition of an oxidizer, a fuel, or other energetic material constituents.

13. The process of Claim 1, wherein the energetic materials are selected from the group consisting of RDX, PETN, HMX, CL-20, TNT, and ammonium perchlorate.

14. The process of Claim 2, wherein the methodology may be carried using energetic materials selected from the group consisting of PETN, RDX, HMX, CL-20, TNT, and ammonium perchlorate.

15. A process for producing energetic materials which includes:

forming a solution;

gelation of the solution;

extracting liquid from the gel by the technique selected from the group consisting of controlled slow evaporation of the liquid phase of the gel and supercritical extraction of the liquid phase of the gel; and

incorporating at least one energetic material constituent during at least one of the solution formation, the gelation of the solution, and the extracting of liquid from the gel.

16. The process of Claim 15, wherein controlled slow evaporation is utilized to produce a xerogel containing energetic material.

17. The process of Claim 15, wherein supercritical extraction is utilized to produce an aerogel containing energetic material.

18. The process of Claim 15, wherein the at least one energetic material constituent is selected from the group consisting of PETN, RDX, HMX, CL-20, TNT, and ammonium perchlorate.

19. The process of Claim 15, carried out to produce desensitized detonator materials containing sol-gel processed energetic material capable of initiation.

20. The process of Claim 5, carried out to produce desensitized energetic material powders.

21. A composition of matter comprising an energetic aerogel or xerogel.

22. The composition of Claim 21, wherein the energetic aerogel or xerogel comprises a porous skeletal structure formed of an energetic material.

23. The composition of Claim 21, wherein the energetic aerogel or xerogel comprises a porous skeletal structure containing an energetic material in its pores.

24. The composition of Claim 21, wherein the energetic aerogel or xerogel comprises a porous skeletal structure which surrounds an energetic material.

25. The composition of Claim 21, wherein the energetic aerogel or xerogel comprises a porous skeletal structure formed of an oxidizer or fuel and containing a complementary fuel or oxidizer in its pores.

add A1

add B3